

SUMMARY AND CONCLUSION

This study included two experiments which were carried out in each of the summer and winter seasons of 1996 and 1997 at the Chipsy Company Farm in Salhia area, Ismaalia governorate and Laboratory of Horticulture Departement at the Faculty of Agriculture Moshotohor, Zagazig University.

FIRST EXPERIMENT:

The first experiment was suggested as an attempt to investigate the effect of three levels of N,P and K fertilizers within seven introduced potato cultivars as well as their combination on vegetative growth, yield and its components, chemical composition of both plant foliage and tuber and suitability for chipsy processing after harvesting and after 3 months storage. The used rates of nitrogen, phosphorus and potassium (NPK) fertilizers were as follows:

1-(150kg N + 60 kg P_2O_5 + 100 kg K_2O / fad.)

2-(175 kg N + 75 kg P_2O_5 + 150 kg K_2O /fad.)

3-(200 kg N+ 90 kg P_2O_5 + 200 kg K_2O / fad.)

Nitrogen was added in three forms i.e., Ammonium sulphate (20.5%N), Urea (46.5 % N) and Ammonium nitrate (33.5 % N), phosphorus as calcium superphosphate (15.5% P_2O_5) and potassium was added in the form of potassium sulphate (48-52 % K_2O).

The phosphorus fertilizer was added as one bush to the soil before planiting. Meanwhile, nitrogen and potassium fertilizer were

added in different portions, some was added as soil application in two equal portions (before planting and before ridging) and other parts were applied with irrigation water throughout the growing seasons in six equal portions starting 21 days up to 60 days after planting.

The studied cultivars of potato were seven. i.e., Lady Rosetta, Accent, Karlana, Sponta, Mirakel, Turbo and Accord in the summer and winter seasons of 1996, seven cultivars in the summer and winter seasons of 1997 were tested but they were Lady Rosetta, Saturna, Karlana, Cycloon, Mirakel, Turbo and Accord. Split plots in a randomized complete blocks design with four replicates was used. The cultivars were distributed in the main plots whereas the fertilization levels were randomly situated in the sub plots.

The obtained results can be summarized as follows:

1-plant vegetative growth: Significant differences were observed among cultivars in vegetative growth characteristics viz plant height, number of branches and fresh and dry weights per plant. In this respect, Sponta, Cycloon, Karlana, Turbo and Saturna. In combination with the third used level of NPK (200kg N + 90 kg P_2O_5 + 20 (kg K_2O / fad.) surpassed other used combinations.

2-Chemical composition of plant foliage: The cvs. Saturna, Accent, Mirakel, Turbo, Cycloon and Accord in combination with the third applied level of NPK fertilizer showed the highest values of N,P,K and total carbohydrates percentage than other combinations.

3-yield and its components: The cvs. Lady Rosetta, Saturna and Turbo in combination with the second and third tested level of NPK fertilizers gave higher number of tubers per plant. While, cvs. Sponta and Cyclooon in combination with the second level of NPK fertilizer gave a higher average of tuber weight than other combinations. The cvs. Lady Rosetta, Saturna, Karlena and Sponta in combination with the third used level of NPK gave higher tuber weight per plant compared with other treatments. Moreover, cvs. Lady Rosetta, Saturna and Karlena in combination with the third applied level of NPK fertilizer, cv. Sponta with the second one and cv. Mirakel with the first one showed higher tuber yield per faddan than all other cultivars in the different used combinations. Concerning the marketable yield per fad. the cvs. Lady Rosetta, Saturna and Karlena with the third level of NPK and cv. Sponta with the second one resulted in the highest values of marketable yield per fad., while cvs. Mirakel and Turbo with first level of NPK or cvs. Cyclooon and Turbo with the second used one showed lower unmarketable yield percentage.

4-Size of tuber : The cv. Mirakel in combination with the first tested level of NPK fertilizer and cvs. Sponta and Cyclooon in combination with the second and third applied levels of NPK fertilizer showed higher values of Large size tubers (> 55mm.) yield and percentage. However, cvs. Lady Rosetta, Saturna, Karlena and Accord in combination with the third tested level

of NPK gave higher yield and percentage of medium tubers (35-55mm.). Meanwhile cv. Lady Rosetta with the first level of NPK and both cvs. Saturna and Turbo in combination with (<35mm.) the third level of NPK fertilizer showed the highest values of small size tubers and its percentage.

5-Chemical composition of tubers before storage: The cvs. Sponta and Turbo in combination with the third applied level of NPK fertilizer showed higher values of (N,P,K, No_3 and protein), while, cvs. Accent and Turbo in combination with the third used level of NPK fertilizer gave a higher value of total amino acids content. Moreover, both cvs. Accord and Mirakel with the same level of NPK fertilizers showed the highest values in reducing, non reducing and total sugars content of potato tubers. However, cvs. Lady Rosetta, Saturna and Karlana showed the lowest values in sugars content, that makes it the most suitable for processing purpose.

6-Cooking quality: The cvs. Lady Rosetta, Saturna and Karlana showed higher values of cooking quality characters (dry matter, colour, Taste and crispy) than other used cultivars.

7-Chemical composition of tubers after storage: The cvs. Sponta and Turbo in combination with the third applied level of NPK showed higher values of N and protein content of tuber. The cvs. Lady Rosetta and Turbo in combination with the third level of NPK showed higher values of P,K and No_3 , while, cvs. Accent and Mirake with the same level of NPK fertilizer showed a

higher content of total amino acids. However, both cvs. Cycloon and Mirakel with the same level of fertilizer showed higher values of reducing, non reducing and total sugars in potato tubers.

8-Cooking quality after storage: The cvs. Lady Rosetta, and Saturna showed a good cooking quality when stored on cold storage at 10C° for 90 days.

SECOND EXPERIMENT:

The effect of cultivar, planting density and their combinations on potato plant growth, yield and quality.

The same studied cultivars in the first trial were also used in this experiment in combination with different plant densities expressed in two hills spacing, i.e., 20 and 30cm between hills on the ridge and two methods of ridging i.e., ridging at 90cm apart with planting on one side of the ridge and other system was planting on wide ridges (beds) of 180cm apart with planting on both the two sides and also in the middle of such wide ridges (beds). Split split plots in a randomized complete blocks design with 4 replicates was performed where planting methods were situated in the main plots, the plant spacings were distributed in the sub plots while the varieties were planted in the sub-sub plots. The obtained results were as follows:

1-Vegetative growth: Significant differences were observed among cultivars in vegetative growth characters viz plant height, number of stems and fresh weight per plant. In this respect, cvs. Mirakel

and Saturna in combination with bed system, and cv. Sponta in combination with ridging system all spaced at 30cm. showed higher significant values than other cultivars.

2-Yield and its components: Both cvs. Mirakel and Saturna in combination with ridging system or cvs. Accent and Saturna in combination with bed system and all spaced at 30cm showed higher values of number of tubers per plant. Moreover, cvs. Sponta planted either on ridge or on bed system and Cycloon in bed system and all of them were spaced at 30cm showed higher values of average tuber weight.

Respecting tubers yield per plant, cvs. Sponta and Cycloon in combination with ridging system and spacing at 30cm gave the highest tuber weight per plant. Concerning total yield per feddan, cv. Sponta in combination with ridging method and spacing at 20 or 30cm a part, cv. Accent planted in ridging system and spaced at 20cm and both cvs. Saturna and Karlana in combination with bed system and spacing at 20cm showed the highest values of total yield per faddan than other used combinations. Regarding marketable yield, cvs. Accent and Sponta in combination with ridging system and spaced at 20 or 30cm apart and cv. Saturna in combination with bed system and spacing at 30cm gave the highest values of marketable yield per fad., Meanwhile, cvs. Karlana, Saturna, Sponta, Mirakel, Turbo and Accord in combination with ridging system and hill spacing at 30cm showed the lowest values of unmarketable yield percentage.

3-Tuber size: Both cvs. Sponta and Cycloon in combination with ridging or bed system and spaced at 30cm showed the highest values of Large size tubers percentage. While, cvs. Lady Rosetta in combination with ridging or bed system, Saturna with ridging and Karlena with bed system and all spaced at 20cm gave the highest values of medium size tuber percentage. Moreover, cvs. Accent, Karlena, Turbo, saturna and Accord in combination with either bed or ridging system and spaced at 20cm gave higher values of small size tuber percentage.

Generally it may be concluded that planting the cvs. Lady Rosetta, Saturna and Karlena and supplied with the highest used level of NPK fertilizer (200kg N + 90kg P₂O + 200kg K₂O /fad.), cv. Sponta with the second tested level (150 kg N + 75 kg P₂O₅ + 150 kg K₂O / fad.) and cv. Mirakel with the first one (150 kg N + 60 kg P₂O₅ + 100kg K₂O / fad.) may be recommended for the highest marketable and total yield per fad. and for good quality of potatoes for processing (chipsy). The cultivars Lady Rosetta, Saturna and Karlena which showed the lowest values in sugars content and high percentage in dry matter content of tubers, are considered as the most suitable for processing specially that they showed a good storageability for the cooking quality when stored in cold storage at 10C° for 90 days.

It may be also concluded that planting cvs. Sponta and Accent in ridging system (90cm) and spacing at 20 or 30cm between plants and planting also cv. Saturna and karlena in bed system (180cm) and

spacing at 20cm between plants produced the highest marketable and total yield per fad.

For obtaining the highest percentage of large size tubers the cvs. Sponta and Cycloon when planted on ridging or bed system and spaced at 30cm between plants are recommended. Moreover, for getting medium tubers cv. Lady Rosetta planted on ridging or bed system and spaced at 20cm cvs. Saturna and Karlana with ridging system and spacing at 20cm between plants. Moreover, cvs. Accord, Karlana, Saturna when grown on beds or ridge and spaced at 20cm apart produced the highest values of percentage of small sized tubers which are recommended for using as seeds.